

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

PRINCETON DIGITAL IMAGE)
CORPORATION,)

Plaintiff,)

v.)

Civil Action No. 12-1461-LPS-CJB

KONAMI DIGITAL ENTERTAINMENT)
INC., HARMONIX MUSIC SYSTEMS,)
INC. and ELECTRONIC ARTS, INC.,)

Defendants.)

PRINCETON DIGITAL IMAGE)
CORPORATION,)

Plaintiff,)

v.)

Civil Action No. 13-335-LPS-CJB

UBISOFT ENTERTAINMENT SA and)
UBISOFT INC.,)

Defendants.)

REPORT AND RECOMMENDATION

In these two related actions (referred to herein as the “*Harmonix* Action” and the “*Ubisoft* Action,” respectively) filed by Plaintiff Princeton Digital Image Corporation (“Plaintiff” or “PDIC”) against Defendants Konami Digital Entertainment Inc. (“Konami”), Harmonix Music Systems, Inc. (“Harmonix”), Electronic Arts, Inc. (“EA”), Ubisoft Entertainment SA (“Ubisoft SA”) and Ubisoft Inc. (“Ubisoft Inc.”) (collectively, “Defendants”), PDIC alleges that Defendants directly and indirectly infringe United States Patent No. 5,513,129 (the “129 patent”). Presently before the Court is the matter of claim construction. The Court recommends that the District Court adopt the constructions set out below for the two terms discussed in this

Report and Recommendation.¹

I. BACKGROUND

A. The Parties

Plaintiff PDIC is a Texas corporation. (D.I. 94 at ¶ 1)² PDIC is the owner, by assignment, of the '129 patent. (*Id.* at ¶ 10)

Defendant Konami is an Illinois corporation with its principal place of business in El Segundo, California. (*Id.* at ¶ 2; D.I. 96 at ¶ 2) Harmonix is a Delaware corporation with its principal place of business in Boston, Massachusetts. (D.I. 94 at ¶ 3; D.I. 97 at ¶ 3) EA is a Delaware corporation with its principal place of business in Redwood City, California. (D.I. 94 at ¶ 4; D.I. 97 at ¶ 4) Defendant Ubisoft SA is a French corporation with its principal place of business in Montreuil-sous-Bois, France. (*Ubisoft Action*, D.I. 72 at ¶ 2) Defendant Ubisoft Inc. is a California corporation with its principal place of business in San Francisco, California. (*Id.* at ¶ 3) Ubisoft Inc. is Ubisoft SA's United States distribution subsidiary. (*Id.* at ¶¶ 3, 30)

Collectively, Defendants are developers, publishers, and/or distributors of one or more of the following: (1) electronic video games, including those in the following series of games: *Karaoke Revolution*, *Dance Dance Revolution*, *Rock Band*, *Just Dance*, and *Rocksmith*; (2)

¹ The parties set out seven terms (or sets of terms) for the Court to construe at the most recent *Markman* hearing in this case. (See D.I. 164 at 1) The first two terms were the "virtual reality"-related claim terms, while the remaining terms involve means-plus-function limitations. The Court herein will address the two "virtual reality" terms. As the remaining terms involve consideration of caselaw relating to means-plus-function claiming or are related to such terms, the Court will address them together in a separate, forthcoming Report and Recommendation.

² For simplicity's sake, the Court will refer to the "D.I." number in the earlier-filed *Harmonix Action*, unless otherwise indicated.

peripheral devices (such as microphones, floor mat game controllers, musical instrument game controllers and cables) for use with the games; and (3) playable song tracks for use with the games. (D.I. 94 at ¶¶ 27, 28, 32, 33, 37; *Ubisoft Action*, D.I. 72 at ¶¶ 26-31)

B. The Asserted Patent

PDIC asserts only the '129 patent in these actions, a patent entitled “Method and System for Controlling Computer-Generated Virtual Environment in Response to Audio Signals.”

(‘129 patent)³ The patent issued on April 30, 1996 from U.S. Appl. No. 91,650, which was filed on July 14, 1993. (*Id.*) It expired on July 14, 2013. (*Id.*; *see also* D.I. 121 at 2 n.3)

The '129 patent relates generally to virtual reality (“VR”) computer systems controlled by music or control tracks created from music. (‘129 patent, col. 1:8-18; *see also* D.I. 94 at ¶ 25)

The patent specification explains that at the time of the invention, VR systems were not new, and there had long been an interest in the VR field to combine music and virtual environments. (‘129 patent, cols. 1:54-57, 2:23-26) To date, explained the patent, “[c]onventional efforts to integrate music with virtual environments [were] all . . . directed toward creation of music from a virtual environment”—“the paradigm . . . has been to create systems that have (virtual) object-driven sounds.” (*Id.*, cols. 2:29-31, 3:43-44) The present invention, however, was designed to “reverse[] the paradigm to create a system which has musically-driven objects[,]” thereby “transcend[ing] traditional use of VR as a musical instrument, and enabl[ing] a VR system to be employed as a virtual stage driven by music.” (*Id.*, cols. 3:44-46, 4:44-46) To accomplish this, the patent recites a VR system that can “rapidly and inexpensively create, animate, or otherwise

³ The '129 patent appears on the dockets in these actions more than once, including as an exhibit to the Joint Claim Construction Chart. (D.I. 118, ex. 1) Citation to the patent will simply be to the “‘129 patent.”

control a wide variety of entertaining virtual environments and virtual objects in response to music or in response to prerecorded ‘control tracks’ which correspond to audio signals (such as music).” (*Id.*, col. 1:45-53) The patent refers to the component of the invention that generates control signals from input music (and/or prerecorded control tracks and/or human generated input signals), or which sends prerecorded control tracks to a VR system, as an “Acoustic Etch.” (*Id.*, col. 4:54-59)

The asserted claims of the '129 patent (dependent claims 14, 19 and 20) are reproduced below, along with independent claims 12 and 16, from which the asserted claims depend:

12. A virtual reality computer system, including:
means for supplying a first signal selected from a group consisting of a control signal having music and/or control information generated in response to a music signal, a prerecorded control track having music and/or control information corresponding to the music signal, and a control signal having music and/or control information generated in response to the prerecorded control track; and
means for receiving the first signal and influencing action within a virtual environment in response to said first signal.

(*Id.*, cols. 29:65-30:9)

14. The apparatus of claim **12**, wherein said music signal is delayed in time to compensate for delays in other parts of the virtual reality computer system.

(*Id.*, col. 30:16-18)

16. A virtual reality computer system for producing a virtual environment, including:
means for prerecording a control track having music and/or control information corresponding to a music signal; and
means for producing the virtual environment in response to said prerecorded control track.

(*Id.*, col. 30:22-28)

19. Apparatus as in claim **16**, wherein said control track contains additional information to that which can be extracted from the music signal.

(*Id.*, col. 30:42-44)

20. The system of claim **16**, wherein said control track is time shifted relative to the music signal to compensate for delays in said virtual reality computer system.

(*Id.*, col. 30:45-47)

C. Procedural Posture

PDIC filed the *Harmonix* Action on November 13, 2012. (D.I. 1) It filed the *Ubisoft* Action on February 27, 2013. (*Ubisoft* Action, D.I. 1) In its most recently filed complaints in these actions, PDIC alleges that Defendants infringe claims 14, 19 and 20 of the '129 patent by their development, testing, use, publication, and/or distribution of: (1) the *Karaoke Revolution*, *Dance Dance Revolution*, *Rock Band*, *Just Dance*, and *Rocksmith* video game series; (2) peripheral devices to be used with the games; and (3) playable song tracks for use with the games. (D.I. 94; *Ubisoft* Action, D.I. 72) On July 17, 2013, Chief Judge Leonard P. Stark referred both cases to the Court to hear and resolve all pretrial matters, up to and including the resolution of case-dispositive motions. (D.I. 30; *Ubisoft* Action, D.I. 10)

Shortly thereafter, in August 2013, the Court held Rule 16 teleconferences and issued Scheduling Orders in both cases. (D.I. 34; *Ubisoft* Action, D.I. 15) During the Rule 16 teleconference in the *Harmonix* Action, the parties requested that the Court hold an early, limited claim construction hearing regarding the two claim terms from the '129 patent discussed herein (“virtual environment” and “virtual reality computer system”), (D.I. 34 at 2); that hearing was held on October 22, 2013, (D.I. 65 (hereinafter, “1st Tr.”)).

Thereafter, in the *Harmonix* Action, while certain initial disclosures were made, the parties agreed that all party-initiated discovery, as well as service of infringement and invalidity contentions, would be stayed pending the outcome of the limited claim construction proceeding. (D.I. 34 at ¶ 4(a) & Appendix B) Meanwhile, in the *Ubisoft* Action, the Court handled a discovery dispute regarding the sufficiency of PDIC's preliminary infringement contentions, with the Court largely agreeing with Ubisoft's position. (*Ubisoft* Action, D.I. 37, 38, 43) As a result of that dispute, the process of exchanging initial disclosures was delayed.

Defendants next filed multiple petitions for *inter partes* review ("IPR") with respect to the '129 patent. On November 15, 2013, Harmonix filed a petition with the United States Patent and Trademark Office (the "PTO") for IPR of certain claims of the '129 patent, (D.I. 118, Joint Claim Construction Chart (hereinafter, "JCCC"), ex. 3 at 5-71),⁴ and the PTO's Patent Trial and Appeal Board ("PTAB") thereafter instituted review on claims 10, 11, 22 and 23 (the "Harmonix IPR"), (*id.*, ex. 3 at 213-233).⁵ On April 15, 2014, Ubisoft SA filed a second petition for IPR of all claims of the '129 Patent, (*id.*, ex. 4 at 8-72), and the PTAB thereafter instituted review of claims 1-13, 15-18 and 21-23, (the "Ubisoft IPR") (*id.*, ex. 4 at 152-76). A third petition for IPR, which included a request for review of claims 14, 19, and 20 (the only claims for which review had not been instituted), was filed jointly by Harmonix and Konami on November 17, 2014 (the "Konami/Harmonix IPR"), along with a corresponding motion seeking joinder of that proceeding

⁴ Citations to the Exhibits of the JCCC will be to the page numbers generated by the ECF system.

⁵ Claims 10, 11, 22 and 23 are referred to as the "non-VR claims" as they merely recite a "computer system," but not a "virtual reality computer system." ('129 patent, cols. 29:53-64, 30:53-65; *see also* Defendants' Claim Construction Presentation, Slide 6)

with the Ubisoft IPR. (*Id.*, ex. 5 at 2-103) The PTAB denied the requested joinder and denied IPR review on procedural grounds. (*Id.*, ex. 5 at 271-90)⁶

Before the cases further progressed in this Court, on January 15, 2014, the Court, at Defendants' request, imposed a stay of both cases pending resolution of the IPR proceedings. (D.I. 70; *Ubisoft* Action, D.I. 52) Those proceedings concluded by January 2016, and they resulted in the invalidation of all 20 of the claims of the '129 patent that were at issue, leaving only 3 dependent claims of the patent (claims 14, 19 and 20) still valid. (*See* JCCC, ex. 3 at 386-414; *id.*, ex. 4 at 384-427) PDIC did not appeal either of the PTAB's Final Written Decisions invalidating the claims in the Harmonix IPR and Ubisoft IPR proceedings.

The Court lifted the stay of these cases on January 21, 2016. On the same date, the Court ordered the parties to submit a joint revised proposed Scheduling Order, and indicated that it would hold an additional *Markman* hearing, in which it would hear further argument as to the two claim terms that were previously addressed at the early *Markman* hearing, as well as on any other terms that required construction. On February 9, 2016, the Court entered a joint Amended Scheduling Order. (D.I. 90; *Ubisoft* Action, D.I. 69) PDIC thereafter filed Third Amended Complaints in the cases that, *inter alia*, conformed to the PTAB rulings by specifically asserting counts of infringement of claims 14, 19 and 20 of the '129 patent. (D.I. 94; *Ubisoft* Action, D.I. 72)

⁶ More specifically, the PTAB concluded that joinder would not "promote efficient resolution of the unpatentability issues without substantially affecting the schedule for the [Ubisoft] IPR" and explained that Harmonix and Konami had failed to persuasively explain why the asserted grounds of unpatentability as to claims 14, 19 and 20 could not have been asserted in the earlier IPR proceedings. (JCCC, ex. 5 at 271, 289)

The parties completed initial briefing on claim construction on August 12, 2016.⁷ (D.I. 121, 130, 147, 163) The Court held a *Markman* hearing on August 31, 2016. (D.I. 182, (hereinafter, “2nd Tr.”)) Following the hearing, the Court ordered Defendants to submit a supplemental letter brief to address newly disclosed caselaw, which Defendants filed on September 12, 2016. (D.I. 180)

II. STANDARD OF REVIEW

It is well-understood that “[a] claim in a patent provides the metes and bounds of the right which the patent confers on the patentee to exclude others from making, using, or selling the protected invention.” *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989). Claim construction is a generally a question of law, although subsidiary fact finding is sometimes necessary. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 837-38 (2015).

The Court should typically assign claim terms their “‘ordinary and customary meaning[.]’” which is “the meaning that the term[s] would have to a person of ordinary skill in the art [‘POSITA’] in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (citations omitted). However, when determining the ordinary meaning of claim terms, the Court should not extract and isolate those terms from the context of the patent, but rather should endeavor to reflect their “meaning to the ordinary artisan after reading the entire patent.” *Id.* at 1321; *see also Eon Corp. IP Holdings, LLC v. Silver Spring Networks, Inc.*, 815 F.3d 1314, 1320

⁷ Defendants in both actions filed joint opening and responsive briefs. (D.I. 130, 163)

(Fed. Cir. 2016).

To that end, the Court should look first and foremost to the language of the claims themselves, because “[i]t is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.” *Phillips*, 415 F.3d at 1312 (internal quotation marks and citations omitted). For example, the context in which a term is used in a claim may be “highly instructive.” *Id.* at 1314. In addition, “[o]ther claims of the patent in question, both asserted and unasserted, can also be valuable” in discerning the meaning of a particular claim term. *Id.* This is “[b]ecause claim terms are normally used consistently throughout the patent, [and so] the usage of a term in one claim can often illuminate the meaning of the same term in other claims.” *Id.* Moreover, “[d]ifferences among claims can also be a useful guide[,]” as when, for example, “the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.” *Id.* at 1314-15.

In addition to the words of the claims, the Court should look to other intrinsic evidence. For example, the Court should analyze the patent specification, which “may reveal a special definition given to a claim term . . . that differs from the meaning [that term] would otherwise possess.” *Id.* at 1316. In that case, “the inventor’s lexicography governs.” *Id.* Even if the specification does not contain a special definition of the term at issue, it “is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.” *Id.* at 1315 (internal quotation marks and citation omitted). That said, however, the specification “is not a substitute for, nor can it be used to rewrite, the chosen claim language.” *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed.

Cir. 2004). The Court should also consider the prosecution history of the patent, if it is in evidence. *Phillips*, 415 F.3d at 1317.

Extrinsic evidence, “including expert and inventor testimony, dictionaries, and learned treatises[,]” can also “shed useful light on the relevant art[.]” *Id.* (internal quotation marks and citations omitted). Overall, while extrinsic evidence may be useful, it is “less significant than the intrinsic record in determining the legally operative meaning of claim language.” *Id.* (internal quotation marks and citations omitted); accord *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 981 (Fed. Cir. 1995).

In utilizing these resources during claim construction, courts should keep in mind that “[t]he construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.” *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998).

III. DISCUSSION

The Court takes up the two disputed terms addressed herein in the order in which the parties addressed them at the *Markman* hearing.

A. “virtual reality computer system”⁸

The disputed term “virtual reality computer system” appears in independent claims 12 and 16 from which the asserted claims 14, 19 and 20 depend. The term also appears again in claims 14 and 20. All parties agree that “virtual reality computer system” should be construed to

⁸ For both of the terms addressed herein, the Court considers the briefing and oral argument relating to the earlier *Markman* proceeding in which these two terms were at issue, (D.I. 48, 52, 54, 56, 65), as well as the briefing and oral argument relating to the second, more recent *Markman* proceeding, which also addressed these terms, (D.I. 121, 130, 147, 163, 182).

require “a computer system programmed with software, and including peripheral devices, for producing a virtual environment.”⁹ (D.I. 121 at 1-2; D.I. 130 at 8) This definition for the term comes directly from the specification of the '129 patent, which states that “[a] computer system programmed with software, and including peripheral devices, for producing a virtual environment will sometimes be referred to herein as a VR system or VR processor.” ('129 patent, col. 1:30-33) In the IPRs, the PTAB, applying the same claim construction standard as applicable here,¹⁰ adopted this definition as its construction of the term. (JCCC, ex. 3 at 219; *id.*, ex. 4 at 160)

The only dispute with respect to this term is raised by Konami, who argues that a VR computer system cannot be a video game system. (D.I. 130 at 8) Konami thus proposes that “virtual reality computer system” be construed as “a computer system, *excluding a video game system*, programmed with software and including peripheral devices, for producing a virtual environment[.]” (*Id.* (emphasis added))¹¹

⁹ This definition includes the term “virtual environment[.]” which Defendants contend is indefinite. (*See, e.g.*, D.I. 130 at 8) The Court will take up Defendants’ argument of indefiniteness next in assessing “virtual environment.”

¹⁰ Because the '129 patent expired on July 14, 2013, the PTAB applied the claim construction standard set forth by the United States Court of Appeals for the Federal Circuit in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005), which also applies here. *See, e.g.*, (JCCC, ex. 4 at 392; D.I. 121 at 2 n.3); *cf. Facebook, Inc. v. Pragmatus AV, LLC*, 582 F. App’x 864, 866 (Fed. Cir. 2014) (“When the [PTAB] reexamines an unexpired patent, it construes the claims under the broadest reasonable interpretation consistent with the specification. . . . When [it] reexamines an expired patent, it construes the claims in accordance with the claim construction standard set forth in [*Phillips*].”).

¹¹ During the earlier *Markman* proceeding, Harmonix and EA sided with Konami in asserting that the term “excludes video game systems.” (*See, e.g.*, D.I. 56 at 14) Shortly after that proceeding, in their IPR petitions, Harmonix, Konami and Ubisoft took the position that the term should be construed as PDIC, Harmonix, EA and Ubisoft now propose (and thus as broad

Both PDIC and Konami focus exclusively on the specification in support of their divergent positions. For its part, Konami argues that the “specification criticizes video game systems and expressly contrasts them with virtual reality computer systems[,]” (*id.*), and that this amounts to a “clear disclaimer” of video game systems from the realm of systems that could be a “virtual reality computer system[,]” (2nd Tr. at 21-24). For the reasons discussed below, the Court disagrees, and does not find Konami’s interpretation of the specification to be persuasive. It therefore finds that the term should be construed in the manner that PDIC and the remaining Defendants propose (and indeed, that all parties, including Konami, advocated for in the IPR proceedings).

To be sure, there are some circumstances in which a patentee may distinguish an invention over the prior art in the patent’s specification—in a fashion amounting to “an unmistakable disavowal of those prior art features.” *Epistar Corp. v. Int’l Trade Comm’n*, 566 F.3d 1321, 1336 (Fed. Cir. 2009). The United States Court of Appeals for the Federal Circuit highlighted one example of such a disavowal in *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322 (Fed. Cir. 2009), a case that Konami relies on in support of its proposed construction. (D.I. 56 at 15-16; D.I. 130 at 8 & n.13) In *Edwards Lifesciences*, the Federal Circuit explained that “[w]here the general summary or description of the invention describes a feature of the invention . . . and criticizes other products . . . that lack that same feature, this operates as a clear disavowal of these other products[.]” *Edwards Lifesciences*, 582 F.3d at 1333 (internal quotation

enough to encompass video games), (JCCC, ex. 3 at 23-24 (Harmonix Petition for IPR review); *id.*, ex. 4 at 15 (Ubisoft Petition for IPR review); *id.*, ex. 5 at 144 (Harmonix/Konami Petition for IPR review)), and cited to video games as invalidating prior art for the “virtual reality computer system” claims, (*see, e.g., id.*, ex. 5 at 182).

marks and citation omitted).

The patents at issue in *Edwards Lifesciences* related to intraluminal grafts that included wires. *Id.* at 1325-26. On appeal to the Federal Circuit, the patentee challenged, *inter alia*, the district court's claim construction that required these wires to be malleable, arguing that the "wires need not be malleable but may instead be resilient [i.e., self-expanding]." *Id.* at 1332. The Federal Circuit affirmed the district court's construction, explaining that, in the specification, the patentee had disparaged prior art resilient wires used to form stent grafts by indicating that there were a "number of problems associated with such known grafts" including that such wires exhibited a "lack of precise control of the expansion of the graft in the lumen." *Id.* at 1332-33 (internal citations omitted). The specification then described the "wires of the invention as malleable" and stated that the new device is expanded by the use of balloons. *Id.* at 1333. In light of this "clear disavowal of scope," the *Edwards Lifesciences* Court held that the "wires required by the claims must be malleable, as the inventors disclaimed the use of resilient, or self-expanding, wires." *Id.* at 1332.¹²

¹² See also, e.g., *Poly-Am., L.P. v. API Indus., Inc.*, 839 F.3d 1131, 1132-34, 1136 (Fed. Cir. 2016) (explaining that "an inventor may disavow claims lacking a particular feature when the specification distinguishes or disparages prior art based on the absence of that feature" and finding that the specification at issue disavowed trash bags with short seals that do not extend inwardly, where the patent repeatedly indicated that prior art bags did not have extended short seals and were difficult to secure over trash receptacle lips, and that the use of extended short seals reduces the bag's upper opening, making it easy to fit around a trash can); *UltimatePointer, L.L.C. v. Nintendo Co., Ltd.*, 816 F.3d 816, 822-23 (Fed. Cir. 2016) (explaining that "'repeated derogatory statements' can indicate that the criticized technologies were not intended to be within the scope of the claims" and finding that the district court did not err in construing "'handheld device'" as "'handheld direct pointing device'" where "[t]aken together, the repeated description in the invention as a direct-pointing system, the repeated extolling of the virtues of direct pointing, and the repeated criticism of indirect pointing clearly point to the conclusion that the 'handheld device' in [certain] claims [] is limited to a direct-pointing device") (cited in Defendants' Claim Construction Presentation, Slide 16).

The caselaw is also clear, however, that even when a patent discusses disadvantages of certain prior art systems, that does not automatically render any such systems disclaimed from the scope of the invention. *See, e.g., Epistar Corp.*, 566 F.3d at 1336 (“[T]his [C]ourt [] recognizes that disparaging comments alone do not necessarily show a manifest or express disavowal of the criticized subject matter.”). In *Epistar Corp. v. Int’l Trade Comm’n*, 566 F.3d 1321 (Fed. Cir. 2009), for example, the accused infringer argued that the patent—directed to a light emitting diode (“LED”) with a special electrically conductive, transparent window layer on top of active LED layers of the semiconductor device—disclaimed the use of indium-tin oxide (“ITO”) in the claimed window layer. *Id.* at 1324, 1334. Thus, the accused infringer explained, the International Trade Commission had therefore erred in construing “transparent window layer” to encompass a current spreading window layer of ITO. *Id.* at 1334. The Federal Circuit rejected this argument, concluding that “[a] single, passing reference to ITO as a relatively unsatisfactory transparent electrical contact in the [background section of the] specification does not disavow the use of ITO as a transparent window layer.” *Id.* at 1335-36.¹³

Here, the “Background of the Invention” section of the '129 patent specification, in describing the context in which the invention came about, conveys that “[w]hile currently being used in the research and scientific communities, VR systems are becoming less expensive and are poised to reach the consumer electronics market as entertainment devices.” ('129 patent, col.

¹³ Just as the Federal Circuit did in *Epistar Corp.*, a district court must consider the “specification as a whole” in determining whether the patentee disclaimed criticized subject matter. *In re Am. Academy of Sci. Tech. Ctr.*, 367 F.3d 1359, 1365-67 (Fed. Cir. 2004) (holding that descriptions of deficiencies of using mainframe computers set out in the “Background of the Invention” portion of the specification did not exclude mainframes from the definition of “user computer” where the “specification as a whole” did not express a clear disavowal of that subject matter).

1:54-57) In further explaining this background, it is true that at one point, the specification does contrast video game systems with VR systems. But critically, it does so in the context of critiquing *both* kinds of systems, as they existed in the prior art:

VR systems must generate a much greater amount of content data (image data and audio data simulating environmental appearance and sounds) than must be generated in most other electronic media. Whereas video game systems require complex scenes to be generated and themes to be programmed, such systems can easily limit the scope of the game content because they can easily constrain the player to move in a few simple directions (e.g., left and right) and need only produce images to be presented on flat screen monitors or on simple 3D field-sequential type monitors.

In contrast, by their very nature, VR systems allow the user to look around and fly around in many different directions and positions. Even where the user is constrained to look only toward the left or the right, VR systems must construct complete representations of 3D worlds. This complexity has made it very difficult to generate virtual worlds for the consumer entertainment market in a quick fashion.

In addition to the complexity of creating static 3D models for virtual worlds, it has also been difficult to control the dynamics of virtual worlds. VR systems to date are notorious for providing only very boring and nearly static environments. The few VR systems that include dynamic motions of the virtual world either base such motions on physical laws (such as gravity) or base the motions on corresponding motions produced by human users (such as the motion of the fingers of a user wearing a conventional “glove” input device).

(*Id.*, cols. 1:58-2:17) Beyond the above discussion of certain shortcomings with then-existing video game systems *and* VR systems, the patent does not further critique video game systems.

(D.I. 52 at 17; 1st Tr. at 85; 2nd Tr. at 11, 13-14)

Accordingly, the intrinsic record here does not mirror that in *Edwards Lifesciences* or that

in other cases like it¹⁴—cases in which the prior art features at issue were clearly repeatedly disparaged. The Court agrees with PDIC’s assessment that “the '129 patent does not state that video game systems are [inherently] inferior, and the way to solve their problems is to use something different, a virtual reality system of the present invention.” (D.I. 52 at 17) Rather, an examination of the specification as a whole reveals that the patentee allowed that a “virtual reality computer system” could be (but is not required to be) a video game system.

This is first indicated by how the patentee described the intended uses for the invention. Following the above-referenced discussion of the deficiencies of both prior art video game systems and prior art VR systems, the specification went on to describe the present invention. It stated that the invention amounted to an improved VR system “which has musically-driven objects” such as “virtual dancer[s]” that respond to music or to a control track. ('129 patent, Abstract & cols. 3:44-46, 5:9) Recall that at its outset, the specification noted that VR systems “are poised to reach the consumer electronic market as entertainment devices”—but complained that then-existing VR systems “made it very difficult to generate virtual worlds for the consumer entertainment market in a quick fashion.” (*Id.*, cols. 1:55-57, 2:4-7) The invention disclosed in the '129 patent was designed to overcome these and other “limitations of conventional VR systems[.]” (*Id.*, col. 2:18-19) The specification thus suggests that the patentee intended for the invention to have use as an “entertainment device[.]” and to be used in the entertainment market. It would seem counter-intuitive, absent good evidence to the contrary, that the patent nevertheless meant to categorically exclude video game systems (a conspicuous type of “entertainment device” referenced in the patent) from those systems that could amount to virtual

¹⁴ Such as the cases cited above in footnote 12.

reality computer systems. (See 2nd Tr. at 11-13 (PDIC's counsel describing video games where the player dances along with characters dancing on the screen and that "that is the type of thing that's being talked about here"—"I have no idea what the research and scientific community would do with virtual dancers were the specification [to] be limited to just applications for that community"))

Furthermore, the Court's conclusion is also supported by the specification's discussion of certain embodiments of the invention. These embodiments indicate that the patentees "contemplated using [video game systems] as part of the 'VR systems' described in" the asserted claims, by suggesting that video game cartridges can be used in the inventive system. (D.I. 121 at 4; *see also, e.g.*, D.I. 48 at 5; 2nd Tr. at 10-11) For example, in describing Figure 2, which depicts an embodiment of the invention, the specification states that:

FIG. 2 shows a variation on the system of Fig. 1 in which a control track and a corresponding music signal are recorded on (and played back from) different media (one from source 1A; the other from source 1). *For example, the control track can be recorded on, and played back from, a cartridge (1A) for a video game machine and the music can be recorded on, and played back from, a CD (1).*

('129 patent, col. 8:58-65 (emphasis added))¹⁵ Additionally, the patent later explains that "[w]hen the Acoustic Etch[] unit [the component of the invention that sends prerecorded control tracks to the VR system] is used in conjunction with a control track, the potential complexity and richness of the virtual environment is enhanced." (*Id.*, col. 11:44-46) In such an embodiment,

¹⁵ The control track is the component of the invention that "actually will be giving instructions on how to alter the virtual environment based on the music signal[,] as it is prerecorded so that the user can "in advance determine what [they] want to have happen in the virtual environment based upon the music[.]" (2nd Tr. at 8, 10-11; *see also, e.g.*, '129 patent, Abstract)

the “Acoustic Etch unit could be incorporated as part of another device, e.g., the player of the input music signal or the prerecorded control tracks or the VR system”—for example, the Acoustic Etch unit could be “integrat[ed] . . . *into a cartridge for a video game machine* with CD capability A program in the cartridge and a track on the CD would be employed or both could be contained on the CD. In addition to minimizing the cables, this is also cost effective.” (*Id.*, cols. 11:63-12:3 (emphasis added))

These described embodiments show that “the control track used to control a virtual reality [system] can be recorded on and played back from a *video game cartridge* . . . which, of course is used to play a video game[.]” (D.I. 48 at 5 (emphasis in original)) The Court agrees with PDIC’s counsel that “it would be [] strange for a patent specification that’s intending to clearly disclaim video game systems to explicitly talk about how you can put your control track on a video game cartridge.” (2nd Tr. at 11)

Konami argues, however, that PDIC’s reliance on these embodiments is misplaced. It asserts that the referenced video game cartridges are merely being used to *store* audio control tracks, and not to play video games, since the specification discloses that cassette tapes and compact disks could alternatively store the audio. (D.I. 54 at 6-7; 2nd Tr. at 28-30) Additionally, Konami argues that the above-referenced embodiments use the Acoustic Etch unit to process the audio tracks stored on the video game cartridge, and then to pass them on to the VR system. The need for an ““interface”” between the two types of systems, Konami claims, “shows that these systems are different.” (D.I. 54 at 7 (citing '129 patent, cols. 7:11-13, 66-67, 8:52-9:10)) In other words, Konami’s view is that even if a video game system is used to read the video game cartridges discussed in the embodiments, that video game system would not be the VR

system—“[i]t would just be something that is reading it, passing it through the acoustic etch interface on to the VR system. It would be something separate.” (1st Tr. at 102-03; *see also id.* at 112 (PDIC noting that according to Konami’s reading of these embodiments, “somebody would make a video game machine with a cartridge . . . [and then the information stored thereon would have to be] sen[t] [] over to some other different system to create a three dimensional or virtual world and they just wouldn’t use the video game”))

While Konami may be right about what the patent describes, in the Court’s view, it is wrong about what should be gleaned from these sentences. Indeed, as referenced above, the patent envisions an Acoustic Etch unit that could be incorporated “as part of another device,” such as “the player of the input music signal or the prerecorded control tracks or the VR system”—such as an Acoustic Etch unit that is “integrat[ed] into a cartridge for a video game machine[.]” (’129 patent, col. 11:62-67) Considering that type of statement, as well as the specification as a whole, there seems to be no reason why that cartridge *could not* also contain video game data, and why the video game machine could not then serve as the relevant VR system that generates the virtual environment. (1st Tr. at 112; D.I. 52 at 13-14) The Court agrees with PDIC that it is a “stretch to say that what [these portions of the specification] is instructing the [POSITA on] is that when he stores something on a cartridge for a video game machine that he should not use it in a video game machine”—i.e., as a video game system that would produce a virtual environment. (1st Tr. at 78; *see also id.* at 112)¹⁶ At a minimum, the evidence of record

¹⁶ As further support for its position that the construction of “virtual reality computer system” should exclude video game systems, Konami argues that the patentee drew a “categorical distinction between” the two types of systems in the specification, and thus established that the “patentee considered virtual reality systems and video game systems to be fundamentally different.” (D.I. 56 at 16-17 (citing ’129 patent, cols. 1:58-2:7)) Konami

does not indicate a clear disavowal of such an outcome.

In view of the specification as a whole, the Court agrees with PDIC that “the fact that [the specification] says you can use [the invention] with video game cartridges, that VR systems are poised to become cheaper and enter the entertainment consumer electronics market, [and that] it’s talking about [applications involving] virtual dancers . . . all of this[,] to the contrary of [disclaiming] [] video game systems[,]” instead affirmatively indicates that the claims *can* encompass a virtual reality computer system that is a video game system. (2nd Tr. at 14 (emphasis added); *see also* 1st Tr. at 110) The Court therefore recommends that the term “virtual

repeatedly cites to *SkinMedica, Inc. v. Histogen Inc.*, 727 F.3d 1187 (Fed. Cir. 2013) in support of this argument. (D.I. 56 at 17-18; D.I. 130 at 8-9 & n.13) In *SkinMedica*, the invention at issue claimed a method of making a composition comprising, *inter alia*, culturing cells in three dimensions. 727 F.3d at 1190. The patent specification discussed characteristics of cells grown by prior art methods and stated that cell lines cultured on beads “*as opposed to* cells grown in three-dimensions” lack certain characteristics. *Id.* at 1197 (certain emphasis added). The Court construed “culturing . . . cells in three dimensions” to exclude culturing on beads, explaining that “[i]t is quite apparent from the use of the disjunctive phrase ‘as opposed to’ that the patentees considered cells grown on beads to be different and distinct from cells grown in what they considered to be three-dimensions.” *Id.* But importantly, there the “as opposed to language” was not the sole piece of intrinsic evidence that compelled the Court’s holding. Rather, the Federal Circuit also noted that “there is no indication in the specification or prosecution history that the inventors believed beads could be used for both two-and three-dimensional culturing[,]” *id.* at 1197-98, and indeed, the opposite was true. The prosecution history and other portions of the specification repeatedly confirmed the patentees’ stance that culturing on beads was different and distinct from the invention recited in the patent involving three-dimensional cultures. *Id.*

Here, though, the intrinsic evidence is much different. In the only portion of the '129 patent specification where the patentees criticized video games, they did so in the context of contrasting then-existing video game systems with then-existing virtual reality systems (and, in some ways, criticizing *both* types of systems). Nowhere does the specification distinguish video game systems from the *present invention*. Indeed, for the reasons noted above, the specification repeatedly suggests that in the future, that invention might well take the form of a video game system. And there is no evidence here that during prosecution of the '129 patent, the patentees limited their inventions to systems excluding video games. For all of these reasons, this case is very different from that in *SkinMedica*.

reality computer system” be construed to mean “a computer system programmed with software, and including peripheral devices, for producing a virtual environment.”

B. “virtual environment”

The disputed term “virtual environment” appears in independent claims 12 and 16 from which the asserted dependent claims 14, 19 and 20 depend. There is no dispute that the specification sets out an explicit definition for the term “virtual environment,” (D.I. 121 at 5; D.I. 130 at 1-2; D.I. 163 at 1; 2nd Tr. at 75), as follows:

The terms “virtual environment,” “virtual world,” and “virtual reality” are used interchangeably to describe a computer-simulated environment (intended to be immersive) which includes a graphic display (from a user’s first person perspective, in a form intended to be immersive to the user), and optionally also sounds which simulate environmental sounds.

(’129 patent, col. 1:22-28) The primary dispute with respect to the term “virtual environment” centers upon the term “immersive” that appears twice in the above definition: what does it mean to be “immersive” or “intended to be immersive[]”? (D.I. 130 at 2; *see also* D.I. 163 at 2) Defendants now argue that the term “virtual environment” is indefinite because the specification fails to provide objective boundaries that would allow a POSITA to know whether a given system is “immersive” or “intended to be immersive.”¹⁷ (D.I. 130 at 2-4; D.I. 163 at 1-4) Further, the parties offer competing proposals, as set out in the chart below, for how the term “virtual environment” should be construed, in the event the Court finds it not indefinite:

¹⁷ During the early *Markman* proceeding in the *Harmonix* Action, Defendants Konami, Harmonix and EA did not argue that the term “virtual environment” was indefinite. Instead, they argued that the term should be construed in line with their proposal at the time (which was to construe “immersive” as “surrounding the user”); Defendants argued that this approach was “fully consistent with the specification of the ’129 Patent and the word’s ordinary meaning to a person of skill in the art.” (D.I. 56 at 9)

Term	PDIC's construction	Defendants' Constructions
"virtual environment"	"a computer-simulated environment (intended to be immersive, i.e., an environment that can be manipulated by the user, so the user perceives interaction with the environment) which includes a two-dimensional or three-dimensional graphic display (from a user's first person perspective, in a form intended to be immersive to the user), and optionally also sounds which simulate environmental sounds"	<p><u>All Defendants:</u> Indefinite</p> <p><u>Konami:</u> Alternatively, "a computer-simulated environment intended to be immersive by surrounding the user, which gives an immersive graphic display shown from the user's first-person perspective and, if sound is used, sounds that simulate environmental sounds"</p> <p><u>Harmonix/EA:</u> Alternatively, "a computer-simulated environment (intended to be immersive) which includes a graphic display (from a user's first person perspective, in a form intended to be immersive to the user, that is, such that the graphics on the display change with the changing position of the head of the user to represent the area of viewing interest of the user and present a complete representation of the three-dimensional virtual objects from the perspective of the user and the user's relative position within the computer-generated environment), and optionally also sounds which simulate environmental sounds"</p>

(D.I. 121 at 4-5) The Court turns first to the parties' arguments with respect to indefiniteness.

1. Is the term "virtual environment" indefinite?

a. Legal Standard

35 U.S.C. § 112 ("Section 112") requires that a patent claim "particularly point[] out and distinctly claim[] the subject matter which the applicant regards as his invention." 35 U.S.C. §

112, ¶ 2.¹⁸ If it does not, the claim is indefinite and therefore invalid. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2125 (2014) (“*Nautilus*”). In *Nautilus*, the Supreme Court of the United States set out the test to be applied in the indefiniteness inquiry: “a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Id.* at 2124. Definiteness is to be evaluated from the perspective of a POSITA at the time the patent was filed. *Id.* at 2128.

The primary purpose of the definiteness requirement is to ensure that patent claims are written in such a way that they give notice to the public of what is claimed, thus enabling interested members of the public (e.g., competitors of the patent owner) to determine whether they infringe. *All Dental Prodx, LLC v. Advantage Dental Prods., Inc.*, 309 F.3d 774, 779-80 (Fed. Cir. 2002). Put another way, “[a] patent holder should know what he owns, and the public should know what he does not.” *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722, 731 (2002).

Like claim construction, definiteness is a question of law for the court. *H-W Tech., L.C. v. Overstock.com, Inc.*, 758 F.3d 1329, 1332 (Fed. Cir. 2014); *Pi-Net Int’l Inc. v. JPMorgan Chase & Co.*, 42 F. Supp. 3d 579, 586 (D. Del. 2014). The Federal Circuit has stated that “[a]ny fact critical to a holding on indefiniteness . . . must be proven by the challenger by clear and convincing evidence.” *Intel Corp. v. VIA Techs., Inc.*, 319 F.3d 1357, 1366 (Fed. Cir. 2003); *see*

¹⁸ Here, the Court refers to the text of Section 112 as it read prior to the passage of the Leahy-Smith America Invents Act, since the application that led to the issuance of the '129 patent was filed before September 16, 2012. (*See* '129 patent); *see also Q.I. Press Controls B.V. v. Lee*, 752 F.3d 1371, 1374 n.2 (Fed. Cir. 2014).

also *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1338 (Fed. Cir. 2008).¹⁹

b. Analysis

As indicated above, the parties' dispute regarding definiteness centers upon the references to "immersive" in the specification's explicit definition of "virtual environment." It is not disputed that "immersive" is a term of degree. (D.I. 130 at 3; 2nd Tr. at 122) While terms of degree "are [not] inherently indefinite," when such a term is used in a claim (or, as in these circumstances, used in the patent's explicit definition of a claim term), "the court must determine whether the patent provides some standard for measuring that degree" and "provide[s] enough certainty to one of skill in the art when read in the context of the invention." *Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1378 (Fed. Cir. 2015) (internal quotation marks and citation omitted); see also *GE Lighting Solutions, LLC v. Lights of Am., Inc.*, — F. App'x —, No. 2015-1979, 2016 WL 6301307, at *2 (Fed. Cir. Oct. 27, 2016). For such claims to be definite, the patent must provide this certainty in the form of "objective boundaries." *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014); see also *GE Lighting Solutions, LLC*, 2016 WL 6301307, at *2. Terms of degree fail to provide sufficient notice of their scope if they depend "on the unpredictable vagaries of any one person's opinion." *Interval Licensing LLC*, 766 F.3d at 1371 (citation omitted).

While Defendants argued in their opening claim construction brief that the patent "offers

¹⁹ In *Nautilus*, the Supreme Court left open the question of whether factual findings subsidiary to the ultimate issue of definiteness should, in fact, trigger the application of a "clear-and-convincing-evidence standard[.]" noting that it would "leave th[is] question[] for another day." *Nautilus*, 134 S. Ct. at 2130 n.10. In the absence of Supreme Court precedent to the contrary, the Federal Circuit's caselaw (utilizing the clear-and-convincing-evidence standard) controls. See *Cal. Inst. of Tech. v. Hughes Commc'ns Inc.*, 35 F. Supp. 3d 1176, 1182 n.4 (C.D. Cal. 2014).

no objective indication of the manner in which an ‘environment’ or a ‘display’ is ‘intended to be immersive[,]’” (D.I. 130 at 3 (emphasis added)), by the time of the most recent *Markman* hearing, they were no longer taking that position. By then, the real crux of the dispute was over whether the specification sets forth a “lower bound[ary]” as to what would qualify as immersive in the context of the patent. (*See, e.g.*, 2nd Tr. at 115-16) Defendants agree that the specification does establish what would fall in the “upper bound[ary]” of immersiveness, (*id.* at 116), as the patent’s next explicit reference to the concept of “immersion” (following the patent’s definition of “virtual environment”) states that “[t]ypically, the illusion of immersion in a virtual reality system is strengthened by the use of head-tracking or some other such system which directs the computer to generate images along the area of viewing interest of the user.” (’129 patent, col. 1:41-45) Thus, the specification makes clear that the illusion of immersion can become *stronger* through the use of a device that tracks the position of a user’s head and updates the display accordingly. Put differently, head-tracking (or similar) devices produce an immersive effect (to a much greater degree than do systems that do not incorporate head-tracking devices). (*See* 2nd Tr. at 95-96 (Ubisoft’s counsel “admit[ting] that at least [the use of head-tracking] is immersive”); *id.* at 116; D.I. 131, Declaration of Dr. Vijay K. Madiseti (“Madiseti Decl.”) at ¶ 38)²⁰

²⁰ The patent explicitly refers to the concept of immersion twice more. (*See* ’129 patent, cols. 19:19-38, 29:10-15) Both of these references are tied to the concept of a head-mounted display. A head-mounted display is a “device which mounts on the head of a human user” and displays the virtual environment to the user; head-tracking means can then be used to indicate the position of the head of the user wearing such a head-mounted display, which directs the system “to generate images along the area of viewing interest of the user.” (*Id.*, cols. 1:42-45, 8:2-17) One of these two additional references to immersion explains that the use of sound processing equipment to create the illusion of having sound come from a particular location in the virtual environment “allows for a much greater realism and correspondence between music and the virtual environment and its objects (assuming that the user wears a head-mounted display, which is preferably a stereoscopic display, along with headphones, so that the user

The question, then, as Defendants have framed it, is whether the specification makes sufficiently clear what would qualify as an environment that is “intended to be immersive” *at all*. (See, e.g., 2nd Tr. at 110 (Harmonix and EA’s counsel explaining that “the problem we’re going to have when we come to evaluat[e] infringement is, is something immersive at all”)) Does the patent draw a discernable lower boundary of immersiveness, such that a POSITA could have reasonable certainty as to what constitutes an immersive computer-simulated environment/graphic display *at all*, and what is not? The Court concludes that Defendants have not met their burden to demonstrate indefiniteness, for at least the following four reasons.

The first reason relates to how the patent describes “immersion” as a term of degree. From this, it obviously follows that there are varying levels or “degree[s] of immersion.” (2nd Tr. at 110; see also *id.* at 121 (PDIC’s counsel noting that there are “a variety of [VR] systems that have different levels of immersion”)) The patent itself acknowledges that there are varying degrees of immersion, such as when it describes a manner in which illusion of immersion can be *strengthened*. (’129 patent, col. 1:41-44)²¹ And yet, the patent’s explicit definition of the term

immersively experiences the virtual environment including three-dimensional placement of its virtual objects, using both the senses of sight and hearing).” (*Id.*, col. 19:19-38 (emphasis added)) In the specification’s other reference to immersion, claim 2 discloses the step of “producing a graphic display of the virtual environment on a display device of a type coupled to a head of a human user which provides an *immersive visual experience* of said virtual environment to the user.” (*Id.*, col. 29:10-15 (emphasis added)) In light of these two further references to “immersion,” it cannot be disputed that the use of head-tracking “strengthen[s]” the illusion of immersion, and that the use of a head-mounted display helps to provide an “immersive visual experience” to the user.

²¹ Indeed, Defendants’ expert, Dr. Vijay Madiseti, opined that at the time of the ’129 patent, “it was well known that ‘immersion,’ in the context of a virtual environment, was an arbitrary measurement and that the ‘level of immersion’ is highly dependent on a number of factors.” (Madiseti Decl. at ¶ 45; see also *id.*, ex. 7 at 1 (undated article stating that “[t]he term ‘immersion’ is a description of a technology, which can be achieved to varying degrees”))

“virtual environment” (hereinafter, the “definitional paragraph”) does not refer to a “strongly immersive” or “totally immersive” or “fully immersive” environment/display—it simply uses the term “immersive.” (*Id.*, col. 1:21-27) This all suggests, as a starting point, that *any* sense of immersion suffices. (2nd Tr. at 60, 63, 121)²²

Second, the above-referenced paragraph of the specification that establishes what falls in the upper boundary of immersiveness (the “upper boundary paragraph”), also sheds light on what it means to be “immersive” *at all*. The upper boundary paragraph directly follows the definitional paragraph, and it provides additional detail as to what the concept of immersion is all about:

The graphic display generated by a VR system can be a two-dimensional (2D) or a three-dimensional (3D) display. Typically, a VR system includes an input device and user interface software

²² In support of their indefiniteness argument, Defendants point to certain of PDIC’s former counsel’s remarks during the earlier *Markman* hearing. (D.I. 130 at 3; D.I. 163 at 2; 2nd Tr. at 85-86) During that early *Markman* proceeding—which occurred in 2013, prior to the Supreme Court’s 2014 *Nautilus* decision—PDIC’s former counsel acknowledged that there were “levels of degrees” with respect to immersion and that “[t]he fact that there is not a bright line where you can say it has to be at least three and three and above is this . . . and below 3 is some other term. . . . there may be a fuzziness as to when something becomes non-immersive to immersive. . . . [s]o the idea that the boundary may be fuzzy, I mean their boundary would be fuzzy, too.” (1st Tr. at 18, 23-24) These remarks came at a time when indefiniteness was not at issue in the case, as Defendants were not then contending that “virtual environment” was indefinite. Thus, this pre-*Nautilus* statement cannot amount to a concession that “immersive” is in fact an indefinite term—any more than could Defendants’ statements at the time (to the effect that the term *did* have a readily understandable meaning) be seen as a concession that the term was sufficiently definite. (See 2nd Tr. at 71-72; see also D.I. 56 at 9 (Defendants asserting that “[c]onstruing ‘immersive’ as ‘surrounding the user’ is fully consistent with the specification of the ‘129 Patent and the word’s ordinary meaning to a person of skill in the art’)) In the Court’s view, the most that can be said of PDIC’s counsel’s statement is that it amounts to an acknowledgment that assessing whether “immersive” is sufficiently definite is a challenging issue. But for the reasons set out below—and having now had the benefit of arguments that had not yet been made at the time of the above-referenced statement—the Court concludes that the patent does provide sufficient guidance as to what constitutes immersiveness.

which enable a user to interact with the scene being displayed, typically to simulate motion in the virtual environment or manipulation of displayed representations of objects (“virtual objects”) in the virtual environment. Typically, the illusion of immersion in a virtual reality system is strengthened by the use of head-tracking or some other such system which directs the computer to generate images along the area of viewing interest of the user.

('129 patent, col. 1:34-45 (emphasis added); *see also* D.I. 121 at 5 & n.11 (PDIC noting that this paragraph “further clarifies [the patent’s] definition” of “virtual environment”))

It is helpful to break the upper boundary paragraph down, sentence by sentence.

The first sentence elucidates that the “graphic display” recited in the definitional paragraph may be a two-dimensional or three-dimensional display. The second sentence then tells us that the “VR system” (which, per the definitional paragraph, we know to be a computer system programmed with software and including peripheral devices *for producing a virtual environment*, i.e., a computer-simulated environment intended to be immersive) typically includes an input device and software. The input device and software, in turn, “enable a user to interact with the scene being displayed” (a scene that the definitional paragraph tells us is displayed from a user’s first person perspective). And so, this second sentence must be conveying *how* it is that the VR system produces a virtual environment that is intended to be immersive—that it does so by producing an environment in which the user *interacts with the scene being displayed*, usually by simulating motion or manipulating objects in the virtual environment. And then the third sentence, in describing how the “illusion of immersion . . . *is strengthened*” has to be understood as building on the prior, second sentence. This too further underscores the idea that the second sentence was describing what it means to be immersed in a virtual reality system (at all). (*See* D.I. 121 at 7 (PDIC explaining that “[t]he patent provides boundaries for determining with

reasonable certainty the scope of” the term “immersive” in “refer[ring] to ‘the illusion of immersion in a virtual reality system’ as being provided . . . by either a two- or three-dimensional display of a ‘virtual environment’ from a user’s first-person perspective, that enables the user to interact with the scene by simulating motion, manipulating virtual objects”))

Third, another portion of the '129 patent’s specification helps articulate what is the lower boundary for “immersive”-ness. (PDIC’s Claim Construction Presentation, Slide 27) In describing an embodiment of the invention correlated with Figure 1, the specification explains that the VR “[p]rocessor 7 is a computer programmed with software *enabling a human user to interact with the virtual environment by manipulating input device 9*, whose output is supplied to processor 7.” ('129 patent, cols. 7:65-8:2, 8:18-21 (emphasis added)) The specification explains that input device 9 could be, for example, “a glove and sensors mounted to the glove for detecting movements of a user’s hand within the glove” or “a frame and sensors for producing output signals indicative of forces or torques exerted on the frame by a user.” (*Id.*, col. 8:21-26) The patent uses the term “VR processor” interchangeably with “VR system,” (*id.*, col. 1:33), and so in this embodiment, this computer system (programmed with software and including peripheral devices) produces the virtual environment with which the user can interact by manipulating objects therein—i.e., an environment that is immersive.²³

²³ Defendants respond to PDIC’s identification of this objective boundary for what it means to be “immersive” by asserting that “the patent never equates immersiveness with any of these other concepts like manipulation or interactivity. It just doesn’t discuss immersive in that way.” (2nd Tr. at 96; *see also id.* at 97-98 (“[T]o the extent [PDIC] is saying [‘]intended to be immersive[’] require[s] manipulation or user perceiving interaction, that is inconsistent with the patent. The patent talks about manipulation or interactivity separate and apart from whether or not the environment itself is immersive.”); Defendants’ Claim Construction Presentation, Slide 36; D.I. 130 at 6) While it is true that the specification does not explicitly state something along the lines of “immersion is herein defined as requiring user interaction with the scene being

Fourth, the specification provides examples of virtual environments that are immersive, and of systems that are not. (D.I. 121 at 7 & n.14; D.I. 147 at 2 & nn. 3-4; 2nd Tr. at 63-65) With respect to terms of degree, where the “intrinsic evidence . . . provides a general guideline and examples sufficient to enable a person of ordinary skill in the art to determine [the scope of the claims], . . . the claims are not indefinite[.]” *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1335 (Fed. Cir. 2010) (internal quotation marks and citations omitted); *see also* (D.I. 121 at 7; 2nd Tr. at 68). The patent provides the following examples of devices that provide users with visual light effects based on audio signals such as music that are “[o]utside the VR field[,]” and that are therefore not immersive:

- (1) an apparatus that controls the display of two-dimensional rings or solid shapes on a television screen, in response to music where “only a limited set of two-dimensional shapes can be displayed and only limited changes in their shape or color can be accomplished in response to the audio input”;
- (2) an apparatus that controls a set of lamps mounted in eyewear worn by a user by switching the lamps on and off in response to music; and
- (3) a system that alters the appearance of colored visual representations of sound waves in response to noise and music.

(’129 patent, cols. 3:58-4:24) As far as examples of environments that *do* constitute virtual environments—and thus are intended to be immersive—the patent describes:

- (1) virtual dancers that dance in time to music;

displayed, typically to simulate motion in the environment or manipulate displayed virtual objects,” that is certainly the import of the upper boundary paragraph and the other portions of the specification cited above. The Court will further address Defendants’ position that immersion is not connected to the concepts of user interaction and manipulation in Section III.B.2, which discusses the proper construction for the term “virtual environment.”

- (2) virtual hands clapping in time to the beat of music, with the “overall level of the music . . . used to determine how many pairs of clapping hands there are at any particular time”;
- (3) virtual cylinders 310A and 310B of equal diameter and different height, the bases of which are located at the same X and Y and Z location, that are animated in response to musical notes in a song and corresponding song lyrics displayed, and an additional object 300A (which is shown at later times at positions 300B, 300C, and so on) that “can be displayed in a manner so that it appears to recede backwards toward position 300B, and then to position 300C, and so on” with a “new object [] appear[ing] on the display at the initial X, Y, and Z location only at instants coinciding with a certain music event, and thus an intermittent stream of objects with a relationship to the frequency content of the source music would appear.”

(*Id.*, cols. 5:7-10, 5:36-44, 11:36-43, 12:17-26, 18:15-19:11 & Fig. 11; *see also id.*, col. 4:45-47

(summarizing the invention as enabling “a VR system to be employed as a virtual stage driven by music”))

During the *Markman* hearing, PDIC’s counsel noted the differences with respect to the two above-referenced groups of examples. The examples falling on the immersive side of the line provide “an environment *with depth* that you’re looking at *and you’re interacting with it* you need to have this scene *with depth*. You need to have this first person perspective that *you’re interacting with*, you’re doing the manipulation.” (2nd Tr. at 62-63 (emphasis added))²⁴

²⁴ The Court notes that during the Ubisoft IPR proceeding, Ubisoft’s counsel similarly noted that the patent sets out some examples of “virtual environments” that “provid[e] some sort of *depth* that kind of just makes you feel like you’re there.” (JCCC, ex. 4 at 345 (emphasis added); *see also id.* at 352, 419 (arguing that a prior art reference, Adachi—which recited a display of a singer performing in front of a band viewed from the perspective of the audience, with the singer moving toward or away from the audience based on the music environment—disclosed a virtual environment where the distance between the virtual singer and background “provides some *depth*. It gives you some dimension as to what the character is doing.”) (emphasis added))

PDIC's counsel then distinguished such examples from those on the non-immersive side of the line, such as two-dimensional objects moving around to music, which "don't really create an environment because there's not that scene or that *depth*["] (*Id.* at 64 (emphasis added); *see also id.* at 73 (explaining that the examples on the "immersive" side of the line "have the scene, the environment, with the *depth and the perspective that you're interacting with*, and the ones that [are on the 'not immersive' side of the line] don't") (emphasis added))

The Court agrees with PDIC that the two sets of examples may be fairly distinguished in this way. On the one hand, with respect to the "non-immersive" examples, there is no "depth" to a display of two-dimensional shapes moving on a television screen, lamps turning off and on, or soundwaves moving up and down in response to music. These systems did not create environments with depth that might allow the user to feel like she was a part of such a scene. On the other hand, with respect to the "immersive" examples, the user is viewing a scene that includes virtual objects with depth from a first-person perspective, which in turn can allow the user to interact with the scene and feel as if she is a part of it.²⁵

²⁵ Whether the term "immersive" was indefinite was an issue that could not be raised (and therefore was not at issue) in the *Ubisoft* IPR proceeding. (*See, e.g.*, D.I. 130 at 10; 2nd Tr. at 88-89) There both the parties and the PTAB relied upon the examples in the patent for guidance on what qualifies as an "immersive" virtual environment. (*See* D.I. 121 at 7 & n.15; *see also* JCCC, ex. 4 at 14-15, 394; Deposition Transcript of Stephen T. Pope (Feb. 5, 2015) ("Pope Dep.") at 56). For instance, in its Final Written Decision, the PTAB stated that "given that the Specification does not elucidate what it means by 'intended to be immersive to the user,' and given that the phrase is subjective, we find the specific embodiments discussed in the Specification to be particularly informative." (JCCC, ex. 4 at 394) (As reflected in the Court's discussion above, the Court does not agree that the specification fails to provide any guidance as to what it means by "intended to be immersive."). And *Ubisoft's* expert in that proceeding, Stephen Pope, testified that to define "virtual environment" in the context of the '129 patent, he likewise was "guided by the definition [set out in the patent] and the examples of the '129 patent." (Pope Dep., page 56) In light of the definition and those examples, Dr. Pope explained that he "believe[s] [that the patent] set[s] a fairly low threshold of what it means to be immersive,

In sum, the Court finds that the specification does include (1) general guidelines setting out the lower boundary of what it means to be “immersive” (and also as to how the illusion of immersion may be strengthened); and (2) examples of virtual environments that exceed that lower boundary and those that do not. All of this helps to define the scope of the term “virtual environment.”²⁶ Defendants have failed to prove by clear and convincing evidence that the POSITA would be unable to determine the scope of “intended to be immersive,” and the Court therefore holds that the term “virtual environment” is not indefinite.²⁷ The next issue, then, is

what it means to be rendered from first-person perspective.” (*Id.* at 56-57; *see also* 2nd Tr. at 68-69; JCCC, ex. 4 at 277-78)

²⁶ Defendants’ indefiniteness argument relies heavily on the Declaration of their expert, Dr. Madisetti, (D.I. 130 at 3; D.I. 163 at 2), who concluded that the ’129 patent offers no objective boundaries for ascertaining the scope of “intended to be immersive,” (Madisetti Decl. at ¶¶ 25-47). The indefiniteness inquiry is governed by the same principles that govern claim construction, and the Court has therefore evaluated the disputed term first in light of the intrinsic evidence. *Nautilus*, 134 S. Ct. at 2128; *Interval Licensing LLC*, 766 F.3d at 1370. In light of the Court’s finding that the intrinsic evidence informs those skilled in the art with reasonable certainty about the scope of what it means to be “immersive” in the context of the ’129 patent, Dr. Madisetti’s analysis of the intrinsic evidence (or his citation to certain extrinsic evidence) does not change the Court’s view. *See, e.g., GE Lighting Solutions, LLC*, 2016 WL 6301307, at *2 n.3 (“Because the asserted claims are not indefinite based on the clear intrinsic evidence, we need not consider any extrinsic evidence.”) (citation omitted).

²⁷ Another aspect of Defendants’ indefiniteness argument is that the “intended to be” language before the patent’s references to “immersive” further renders the term indefinite. Defendants ask, for example, what does “intended to be” immersive mean, whose intent is the patent referring to? “Is it the programmer of the code who’s creating the computer environment or is it the manufacturer of a programmer on the display or is it the user[?]” (2nd Tr. at 95; *see also* D.I. 130 at 3) PDIC’s counsel responded that “Defendants . . . are reading way too much into that [‘intended to be’ language], and it doesn’t require us . . . to look into the secret hopes and dreams of a game designer. I submit when you use the system as intended, it will have an immersive effect [and] if you’re using it not as intended and it doesn’t, don’t blame us. . . . So I don’t read anything particular into ‘intended to be immersive’ versus ‘immersive[.]’” (2nd Tr. at 120) The Court agrees that this is a logical reading of the “intended to be” language and that such language does not render the term “virtual environment” indefinite.

how the term “virtual environment” should be construed.

2. What is the proper construction for the term “virtual environment”?

As reflected in the chart above, the parties have two disputes with respect to the proper construction for the term “virtual environment”: (1) do the references to “immersive” in the patent’s explicit definition of the term mandate “surrounding the user,” and/or do they require the use of head-tracking or some other means that causes the graphics on the display to change with the changing position of the user’s head;²⁸ and (2) if sound is used, must those sounds simulate environmental sounds? (*See* D.I. 121 at 4; PDIC’s Claim Construction Presentation, Slide 10)

The Court will take up these disputes in turn.

a. Does “immersive” require surrounding the user and/or the use of head-tracking?

Konami asserts that immersive should be construed to mean “surrounding the user,” and Harmonix and EA contend that immersive should be construed to mean that “the graphics on the display change with the changing position of the head of the user to represent the area of viewing interest of the user and present a complete representation of the three-dimensional virtual objects from the perspective of the user and the user’s relative position within the computer-generated

²⁸ The Court notes that while “immersive” itself is not used in any claim, the parties’ dispute with respect to the scope and meaning of the term, which is referenced in the patent’s explicit definition of “virtual environment,” enables the Court set out a definition for “immersive” in its construction for the claim term “virtual environment.” *See, e.g., Advanced Fiber Techs. (AFT) Trust v. J & L Fiber Servs., Inc.*, 674 F.3d 1365, 1373 (Fed. Cir. 2012) (noting that while courts ordinarily do not construe words that are not in claims, “in those cases in which the correct construction of a claim term necessitates a derivative construction of a non-claim term, a court may perform the derivative construction in order to elucidate the claim’s meaning”).

environment.” (D.I. 130 at 1)²⁹ While these three Defendants collectively argued that immersive means “surrounding the user” during the earlier *Markman* proceeding, (*see, e.g.*, D.I. 56 at 7), Harmonix and EA now explain that their revised proposal is in “complete alignment” with Konami’s proposed construction and that their new proposal simply contains additional words that provide “more specifics in order to [explain] how [] we get to something that surrounds the user[,]” (2nd Tr. at 103; *see also id.* at 118-19 (Konami’s counsel agreeing that the two proposals are “completely coextensive because . . . if you have a head tracking means [] you will have this perception of surrounding”); D.I. 130 at 5).

The Court declines to adopt either of Defendants’ constructions. Instead, it agrees with PDIC that both proposals “seek to improperly narrow the scope of this term to include limitations requiring changing the graphics as the user moves his or her head, so that the environment surrounds the user.” (D.I. 147 at 3)³⁰ Though it is true that all of the relevant figures in the

²⁹ Ubisoft has not proposed a construction for the term “virtual environment.” (D.I. 130 at 1; 2nd Tr. at 90) The Court notes, however, that during the Ubisoft IPR, Ubisoft argued (and the PTAB agreed) that in the context of the '129 patent, the term “immersive” did not *require* the concepts of head-tracking or surrounding the user. (*See, e.g.*, JCCC, ex. 4 at 275-78 (Ubisoft arguing that the patentee’s “narrow interpretation of a ‘virtual environment’” as one that changes to match a corresponding change in a user’s perspective “is inconsistent with the '129 patent specification”))

³⁰ In addition to its substantive arguments that attack Defendants’ proposals, PDIC also posits that Defendants “are barred from asserting these [] constructions because, in the IPR proceedings, they argued to the Board that the claims do not require these features[.]” (D.I. 147 at 3 & n.9) PDIC is correct that in the Konami/Harmonix IPR, Defendants Konami and Harmonix argued that the same prior art that Ubisoft relied upon—which did not disclose head tracking or surrounding the user—nonetheless disclosed a virtual environment. (JCCC, ex. 5 at 20, 38) However, the Court does not agree that issue preclusion applies in this circumstance. Issue preclusion applies when “(1) the identical issue was previously adjudicated; (2) the issue was actually litigated; (3) the previous determination was necessary to the decision; and (4) the party being precluded from relitigating the issue was fully represented in the prior action.” *Fairchild Semiconductor Corp. v. Power Integrations, Inc.*, C.A. No. 12-540-LPS, 2015 WL

patent recite the use of head-tracking, (*see* '129 patent, Figs. 1, 2, 6, 10; *see also* 2nd Tr. at 39; Defendants' Claim Construction Presentation, Slides 42-44), Harmonix and EA's counsel acknowledged that "there's nothing in the patent that specifically says immersion requires head tracking *and it does call it optional*," (2nd Tr. at 108 (emphasis added)). Indeed, as discussed repeatedly above, the specification indicates that "the illusion of immersion in a virtual reality system is *strengthened* by the use of head-tracking or some other such system which directs the computer to generate images along the area of viewing interest of the user," ('129 patent, col. 1:41-45 (emphasis added))—thus conveying that an environment can be immersive even if it did not utilize such a device, (D.I. 121 at 8; *see also* D.I. 52 at 6-7). A later reference to head-tracking means in the patent (relating to Figure 1, a preferred embodiment of the invention) reiterates this idea:

Display device **8** can be any of a variety of devices, such as a device which mounts on the head of a human user (preferably including left and right monitors for providing a stereoscopic display to the user), *or* a single flat screen display which outputs either a non-stereoscopic display or a stereoscopic display. Head-tracking means **11** . . . is provided *for optionally* providing input . . . indicative of the position of the head of a human user wearing a head-mounted embodiment of display device **8**.

('129 patent, col. 8:7-17 (emphasis added)) This description confirms that the patent does not *require* the user to utilize a head-mounted display, and furthermore does not *require* head-

1905871, at *1 (D. Del. Apr. 23, 2015) (quoting *Jean Alexander Cosmetics, Inc. v. L'Oreal USA, Inc.*, 458 F.3d 244, 249 (3d Cir. 2006)). The only relevant IPR proceeding that resulted in a Final Written Decision was the Ubisoft IPR. And issue preclusion could not possibly apply to Ubisoft here, since it does not offer a proposed construction. Ubisoft only argues with respect to the term "virtual environment" that it is indefinite, an issue that was not litigated in the IPR proceedings. Indeed, in the Ubisoft IPR proceeding, Ubisoft SA specifically noted that it was reserving the right to argue in this litigation that the term at issue was indefinite. (JCCC, ex. 4 at 13 n.1)

tracking means to be used. (2nd Tr. at 42) Accordingly, the Court rejects Defendants' efforts to improperly read in a limitation that "immersive" in the context of the patent *requires* "surrounding the user" or the use of a head-tracking device (or some equivalent that enables the graphics on the display to change with the changing position of the head of the user). *See, e.g., Phillips*, 415 F.3d at 1323 ("[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments.").

That leaves the question of what does "immersive" require, a question that was already considered in some detail in the above discussion of definiteness. As noted above, the specification conveys that an environment and display intended to be "immersive" is one that depicts scenes with depth, (*see* 2nd Tr. at 63, 64, 73), and that enables "a user to interact with the scene being displayed, typically to simulate motion in the virtual environment or manipulation of . . . 'virtual objects'[] in the virtual environment[,] ("129 patent, col. 1:38-41). The Court will therefore recommend that the term "intended to be immersive" in the definition of "virtual environment" be construed to mean "i.e., an environment with depth that enables the user to interact with the scene being displayed, typically by simulating motion or manipulating virtual objects in the virtual environment" and also include in the construction that the relevant graphic display be "from a user's first person perspective." Such a construction is similar to PDIC's proposal. (D.I. 121 at 4)³¹ It is also not that different from the "ordinary meaning" for

³¹ The Court will not adopt PDIC's proposed construction word-for-word, since the user interaction with the displayed scene that the specification describes is "typically" in the form of manipulating displayed virtual objects *or* simulating motion in the virtual environment. ('129 patent, col. 1:37-41)

“immersive” that PDIC pointed to in the earlier *Markman* proceeding as being an acceptable construction—that is, that “[a]n ‘immersive’ digital environment is an artificial interactive computer created scene or ‘world’ *with which the user interacts* in a natural intuitive manner such that the user is made to feel like they are a part of it.” (D.I. 52 at 2 & n.3 (emphasis added) (citations omitted); *see also* 1st Tr. at 14-15)

Finally, the Court addresses Defendants’ remaining two arguments as to why a proposal like PDIC’s is incorrect. For the reasons set out below, it finds both arguments wanting.

First, Defendants argue that equating immersiveness with “manipulating the environment” makes no sense, given that non-VR video games that existed at the time of the patent could also be manipulated: that “every video game involves manipulation of the environment you’re seeing on the screen” and so “in the context of the patent[,] manipulation doesn’t have anything to do with what it means to be immersive.” (2nd Tr. at 117-18; *see also* Defendants’ Claim Construction Presentation, Slide 37) The problem with this argument is that it overlooks the entirety of PDIC’s proposed construction; PDIC is not asserting that immersiveness is achieved merely by manipulating an environment. Rather, PDIC’s view of “immersive” is that it is an environment that can be manipulated by the user, so the user perceives interaction with the environment, which includes a graphic display *from a user’s first person perspective*. (D.I. 121 at 4) While Defendants pointed to testimony from PDIC’s expert in the IPR proceeding as supposedly supporting their position that user manipulation does not equal immersiveness, (D.I. 130 at 6), the expert’s point was just this—that manipulation alone is not *all* that the patent requires for “immersiveness”:

Q. So, I mean, what you’re describing to me, at least the way I’m hearing it is, a video game would be immersive then,

where I use my joystick to turn and the screen changes; is that right?

- A. I mean, you could have immersive video games where you could have—you know, you might be able to have, you know—but, remember, we’re talking about the first-person perspective.

So in most video games, you know, you may have—your perspective is a particular dot or something you’re manipulating, for instance, but you’re not inside that reality, and that’s what virtual reality is about. It’s that you are really inside that reality. And I think that is what is described in quite some detail in Columns 1 and 2 in the patent.

(D.I. 130, ex. 1 at 152; *see also* Defendants’ Claim Construction Presentation, Slide 38)

Second, Defendants argue that PDIC’s construction should be rejected because it fails to distinguish between “immersive” and “nonimmersive” virtual environments, given that “in 1993, there existed both ‘immersive’ and ‘nonimmersive’ [virtual reality] systems [which] [b]oth created virtual environments that allow users to manipulate and interact with 3D virtual objects.”

(D.I. 130 at 6-7 & n.6) But a close look at certain of the articles that Defendants cite in support shows that, in reality, there are degrees of immersion—underscoring that one must look *to the ’129 patent* in order to glean the patentee’s view of what would constitute immersion *at all*. For instance, Defendants cite to a February 1993 article (“the Robertson article”) that identifies the “goal of virtual reality systems” as being “to place the user in a three-dimensional environment that can be directly manipulated” and noting that “[t]he usual definition of [virtual reality] involves *full immersion*” in which users wear head-mounted displays “to provide full visual immersion” and gloves that allow “for directly manipulating the environment.” (D.I. 63, ex. 2 at 81 (emphasis added)) The Robertson article further reveals that an alternative form of virtual

reality is being explored that it describes as “[n]onimmersive” virtual reality, which “also places the user in a 3D environment that can be directly manipulated, but it does so with a conventional graphics workstation[.]” (*Id.*) The article continues that while “[f]ull immersion is often seen as a major advantage[.]” in nonimmersive virtual reality systems, “[m]ental and emotional immersion takes place, in spite of the lack of visual or perceptual immersion.” (*Id.* (emphasis added)) In other words, this article labels any system that does not require *full* immersion (e.g., the use of a head-mounted display) as non-immersive, while noting that such systems *can still be immersive* in other senses. The '129 patent does not mandate “full immersion,” and so what one piece of prior art might label as non-immersive can still qualify as being “immersive” in the context of the patent. (2nd Tr. at 121-22)

b. Must sounds, if used, simulate environmental sounds?

As reflected above in the specification’s explicit definition for “virtual environment,” such an environment “includes . . . optionally also sounds which simulate environmental sounds.” ('129 patent, col. 1:21-28) The final dispute with respect to the term “virtual environment” is whether the patent mandates that, if sounds are used in the claimed virtual environment, those sounds must be environmental sounds that surround the user, as Konami argues. (D.I. 130 at 1) PDIC, Harmonix and EA propose that a virtual environment may include sounds which simulate environmental sounds, “without requiring such sounds or prohibiting the use of other types of sounds[.]” (D.I. 121 at 4-5, 8)

The Court agrees with PDIC that the specification does not require that, if sound is used, that sound *must* be environmental sounds surrounding the user. (D.I. 52 at 12; D.I. 121 at 9) This conclusion is easily reached in light of the patent’s explicit teaching that if sound is used in

the virtual environment, that sound can be produced by sending the sound directly to headphones (in which case it would not be environmental sounds that surround the user), *or* it may be processed first by the VR system, in order to emit environmental sounds that surround the user.

For instance, the patent explains that:

The audio can bypass the VR system and go directly to headphones 10, however, note that in FIGS. 1 and 2, the music is passed through VR processor 7 rather than directly into the headphones 10. In this way the VR processor may convolve the sound in such a way as to create the illusion of having it coming from a particular location in the virtual environment.

('129 patent, col. 12:4-10) Later, the patent teaches that “[s]ound processing equipment . . . can *optionally* be connected” to the system, which equipment will process sound to create the illusion of the sound as coming from a particular location in the virtual environment. (*Id.*, col. 19:19-31 (emphasis added)) Such a technique “allows for a much greater realism and correspondence between music and the virtual environment and its objects” assuming that the user wears a head-mounted display and headphones “so that the user immersively experiences the virtual environment including three-dimensional placement of its virtual objects, using both the senses of sight and hearing[.]” (*Id.*, col. 19:31-39) While the invention certainly may include environmental sounds that surround a user, then, nothing in the specification *requires* this—the patent does not mandate that the illusion of immersion in the claimed virtual environment must include sound immersion.

3. Conclusion

For all of these reasons, the Court recommends that “virtual environment” be construed to mean “a computer-simulated environment (intended to be immersive, i.e., an environment with depth that enables the user to interact with the scene being displayed, typically by simulating

motion or manipulating virtual objects in the virtual environment) which includes a two-dimensional or three-dimensional graphic display (from a user's first person perspective, in a form intended to be immersive to the user), and optionally also sounds which simulate environmental sounds.”

IV. CONCLUSION

For the foregoing reasons, the Court recommends the following constructions:

1. “virtual reality computer system” means “a computer system programmed with software, and including peripheral devices, for producing a virtual environment”
2. “virtual environment” means “a computer-simulated environment (intended to be immersive, i.e., an environment with depth that enables the user to interact with the scene being displayed, typically by simulating motion or manipulating virtual objects in the virtual environment) which includes a two-dimensional or three-dimensional graphic display (from a user's first person perspective, in a form intended to be immersive to the user), and optionally also sounds which simulate environmental sounds”

This Report and Recommendation is filed pursuant to 28 U.S.C. § 636(b)(1)(B), Fed. R. Civ. P. 72(b)(1), and D. Del. LR 72.1. The parties may serve and file specific written objections within fourteen (14) days after being served with a copy of this Report and Recommendation. Fed. R. Civ. P. 72(b)(2). The failure of a party to object to legal conclusions may result in the loss of the right to de novo review in the district court. *See Sincavage v. Barnhart*, 171 F. App'x 924, 925 n.1 (3d Cir. 2006); *Henderson v. Carlson*, 812 F.2d 874, 878–79 (3d Cir. 1987).

The parties are directed to the Court's Standing Order for Objections Filed Under Fed. R.

Civ. P. 72, dated October 9, 2013, a copy of which is available on the District Court's website, located at <http://www.ded.uscourts.gov>.

Dated: December 2, 2016



Christopher J. Burke
UNITED STATES MAGISTRATE JUDGE